U. S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
National Marine Fisheries Service
Southeast Fisheries Center
P. O. Drawer 1207
Pascagoula, MS 39567

FRS OREGON II Cruise 79-04(97)
6/13 - 8/3/79

FRS OREGON II Cruise 97 was divided into three phases: 1) a reef fish habitat survey in the western Gulf of Mexico, 2) assist the Miami swordfish tournament as the communication center, and 3) a shallow and deepwater reef fish survey off Puerto Rico and the Virgin Islands. The FRS OREGON II departed Pascagoula June 13 and returned August 3 after completing all scheduled activities.

PHASE I - REEF FISH HABITAT SURVEY

Introduction

Phase I of OREGON II Cruise 97 concluded a survey of reef fish habitats in the western Gulf of Mexico between Galveston, TX and Brownsville, TX in 5 to 50 fathoms. Cruise objectives were to determine distribution and percentage of bottom types according to the following classifications: 1) rock, coral and sponge with relief exceeding one meter; 2) rock, coral and sponge with relief of less than one meter; 3) vegetative bottom - sea grass or algal flats; 4) sand or sand/shell; and 5) mud.

Data Collecting Procedures

Bottom type was determined by viewing closed-circuit underwater television (CCUTV) imagery at preselected stations. The CCUTV system was lowered to within a meter of the sea floor and visual impressions of the bottom recorded. Video recordings were taped at each station and annotated with audio recordings. Hydrographic data acquired at each station included surface temperature and salinity, water color, and secchi depth.

Results

The bottom slopes gently in the western Gulf of Mexico between Galveston, TX and Brownsville, TX in depths of 5 fms to 50 fms. None of the 270 stations occupied indicated relief exceeding one meter. The substrate consisted primarily of mud and sand interspersed with shell fragments at some stations. Visibility was poor; secchi readings ranged from 3 to 30 feet and averaged 10 feet. Heavy sediment loads were suspended from one to two meters above the bottom at the majority of stations within the 20 fms contour.

During the survey, the pan mechanism failed and one underwater bulb burned out. Data acquisition was not affected.

PHASE II - SWORDFISH TOURNAMENT

During the second phase, the FRS OREGON II served as a communications center for the Miami Swordfish Tournament. National Marine Fisheries Service personnel provided the tournament fleet with water temperature data and the occurrence of commercial ship traffic.

PHASE III - CARIBBEAN REEF FISH SURVEY

Introduction

This cruise was conducted in response to the Caribbean Fishery Management Council's request for information on deepwater snapper/grouper populations and bottom habitat. These snapper/grouper populations remain largely unexploited.

Survey objectives were to determine the species and size composition and catch per unit effort for reef fish in deep water using bottom longlines, electric reels, and wire fish traps. The survey also attempted to determine distribution and abundance of squid.

Survey Area, Methods and Gear

The survey area included the shelf and slope off the north coast of Puerto Rico, Culebra Island and St. Thomas, Virgin Islands, from 25 to 300 fathoms (Figure 1). The groundline of the bottom longline gear was approximately 1200 feet long with hooks placed every eight feet. Day and night sets were made at preselected sample sites. Each set consisted of about 150 circle hooks (No. 6) baited with fresh frozen squid and fished for two hours. During this interval, three electrically powered commercial fish reels were fished as the ship drifted. Reels were equipped with 1000 feet of cable, three No. 6 circle hooks baited with fresh frozen squid, and weights. Ten locally designed commercial wire fish traps were fished at three sites in 25 to 50 fms both day and night. Traps were baited with an assortment of squid, fish heads, and frames. Night lights were employed to attract squid and an automated commercial squid jigging machine used to catch squid.

Results

Bottom Longline Fishing

Fifty-two stations were completed along the north shelf edge in 50 to 300 fms (Figure 1). Bottom longlines were set on moderate to

steep slopes characterized by rocks, ledges, and coral (Figure 2). A total of 423 fish were caught weighing 3,423 lbs (Table 1).

Eight species of snapper contributed 19% of the total catch with 163 fish weighing 649 lbs. Principal species included silk snapper, 46 fish - 206 lbs; queen snapper, 17 fish - 162 lbs; and wenchman, 73 fish - 132 lbs. Other species included dog, mutton, blackfin and vermilion snappers. The best catch of snappers occurred during daylight in depths of 90-200 fms north NW of St. Thomas, Virgin Islands, at 18°35' N latitude, 65°07' S longitude (Figure 2). Nine queen snapper were caught weighing 76 lbs, with weights ranging from 3.0 to 14.5 lbs. Locations of snapper captures weighing 20 lbs or more per set are shown as triangles in Figure 1. The total weight of snapper caught in each set, location, and depth is listed in Table 2.

Seven species of groupers made up 41% of the total catch by weight with 82 fish weighing 1,404 lbs. Misty grouper was the major species caught with forty-two fish weighing 1,123 lbs. The average weight was 27 lbs. Other species included the yellowedge, 7 fish - 185 lbs; red hind, 24 fish - 31 lbs; yellowfin, 2 fish - 38 lbs; nassau, 1 fish - 16 lbs; red grouper, 1 fish - 10 lbs; and coney, 2 fish - 1.5 lbs. The best grouper catch occurred off Puerto Rico in 100 to 175 fms. Four misty grouper were caught weighing 137 lbs with weights ranging from 4.0 to 80.0 lbs. Locations of grouper captures weighing 40 lbs or more per set are shown as open circles in Figure 1. The total weight of grouper caught in each set, location, and depth is listed in Table 2.

Combined catch rates of snapper and grouper averaged 20.1 lbs per hour per 150 hooks or about 121 lbs per 24 hour sampling period. Bottom longline fishing continued for 17 days with an average of three sets per day. Fishing time per set was two hours bottom time. Sets were made both day and night with 27 night and 25 day sets.

Day/night catch rates were similar with an average of 40.9 lbs at night and 38.0 during daylight hours. A significant difference was noted between depths less than or greater than 100 fms with the shallower depths catching an average of 29.3 lbs and the deeper areas 44.9 lbs per set.

At least 14 other species including sharks, amberjack, barracuda, and eel contributed 40% of 1,370 lbs to the overall catch (Table 1). Dogfish and six-gill sharks caught were the major components, accounting for 91% of all species, other than snapper/grouper.

Of the 52 bottom longline sets, nine failed to catch snapper or grouper; twelve caught snapper only; nine caught grouper only; and twenty-two caught both snapper and grouper. Gear loss amounted to 625 hooks, four anchors, and eight tubs of mainline.

Results of bottom longline fishing demonstrate that the deepwater shelf/slope grounds off the north coast of Puerto Rico, Culebra Island, and St. Thomas, Virgin Islands, has a harvestable stock of snapper and grouper during summer months. Additional surveys should be conducted on the same grounds in fall, winter and spring to determine seasonal availability of fish. Special efforts should be made to develop a market for shark as their small size and lack of urea makes them suitable for human consumption.

It should be emphasized that bottom lines must be made of comparatively strong material to resist abrasion and cutting on the rock and coral bottom. Before setting, a "dry" run should be made over the bottom to determine slope gradient. Gear loss can be minimized by setting on moderate slopes and avoiding steep slopes.

Electric Snapper Reels

Three electrically-powered commercial snapper reels were fished at thirty-four stations in 17 to 200 fms during the time the bottom longlines and traps were fishing. Total fishing effort amounted to 102 man hours with 20 fish weighing 41 lbs caught at 10 stations. Species breakdown by weight and number of reel-caught fish are listed in Table 3.

The catch rate of snapper and grouper combined was 0.31 lbs per hour per reel. The failure to catch significant amounts of fish with the commercial reels was most likely due to strong currents and winds causing the ship to drift too fast with the result that the baited hooks failed to tend bottom. The use of a sea anchor may reduce the ship's drift and permit the hooks to tend bottom. Pick-up speed on the reels is very fast, and some fish were undoubtably lost when the hooks were set as the fish were being brought to the surface.

Wire Fish Traps

Ten wire fish traps were set both day and night in 27 to 49 fms at three locations north of Culebra Island east of Puerto Rico. Traps were deployed in the vicinity of bottom longline sets. The average fishing time for ten traps at each station was 8.8 hours, and the total trap effort at six stations amounted to 53 hours.

Ninety-one fish weighing 161 lbs were captured in the fish traps. Species breakdown by weight and number is listed in Table 4. Snapper accounted for 59 fish weighing 60 lbs; grouper, 13 fish weighing 92 lbs; and other species, 19 fish weighing 9 lbs. Snapper/grouper accounted for 94% of the total trapped species.

Snapper and grouper showed a preference for traps baited with squid. Traps baited with mullet, fish frames and amberjack failed to attract any snapper or grouper. Night trap catches were somewhat higher than the day catches at the same location, with overall catch rates of snapper and grouper 0.27 lbs per hour per trap.

Squid

Night lights failed to attract large numbers of squid. A commercial squid jigging machine was turned on when small concentrations gathered under the lights, but no squid were caught. In some instances, it appeared that squid avoided the jigs. Few squid were caught with a dip net and identified as Loligo peleai.

Age and Growth Samples

Length and weight data, otoliths, scales and gonads were taken from snapper and grouper for age, growth and fecundity studies by NMFS Laboratory personnel, Beaufort, NC.

Seafood Technology Samples

Samples of snapper and grouper were collected at the request of the Director of the NMFS National Seafood Quality and Inspection Laboratory, Pascagoula, MS. The samples will be chemically analyzed to help in the positive identification of questionable species by USDC seafood inspectors.

CRUISE PARTICIPANTS

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7/2-8/3/79

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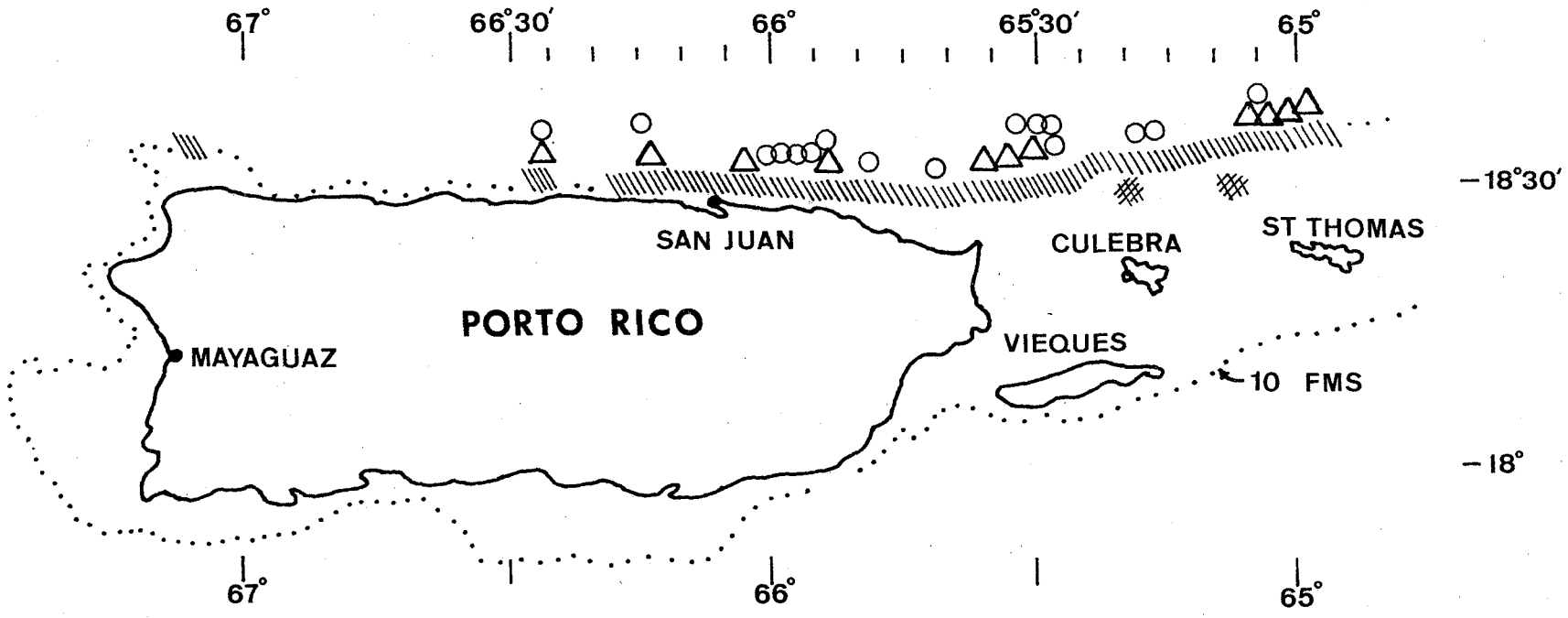

Figure 1. Survey coverage OREGON II Cruise 97 July 1979 Puerto Rico to St. Thomas. Oblique lines represent the grounds fished with bottom longline gear and electric fish reels. Cross hatch lines represent grounds where bottom longlines, electric fish reels and wire fish traps were fished. Triangles represent approximate locations where 20 pounds or more of snapper were caught per bottom longline set; open circles represent locations where 40 pounds or more of grouper were caught per longline set. Each set consisted of approximately 150 hooks, baited with squid, and fished for two hours.

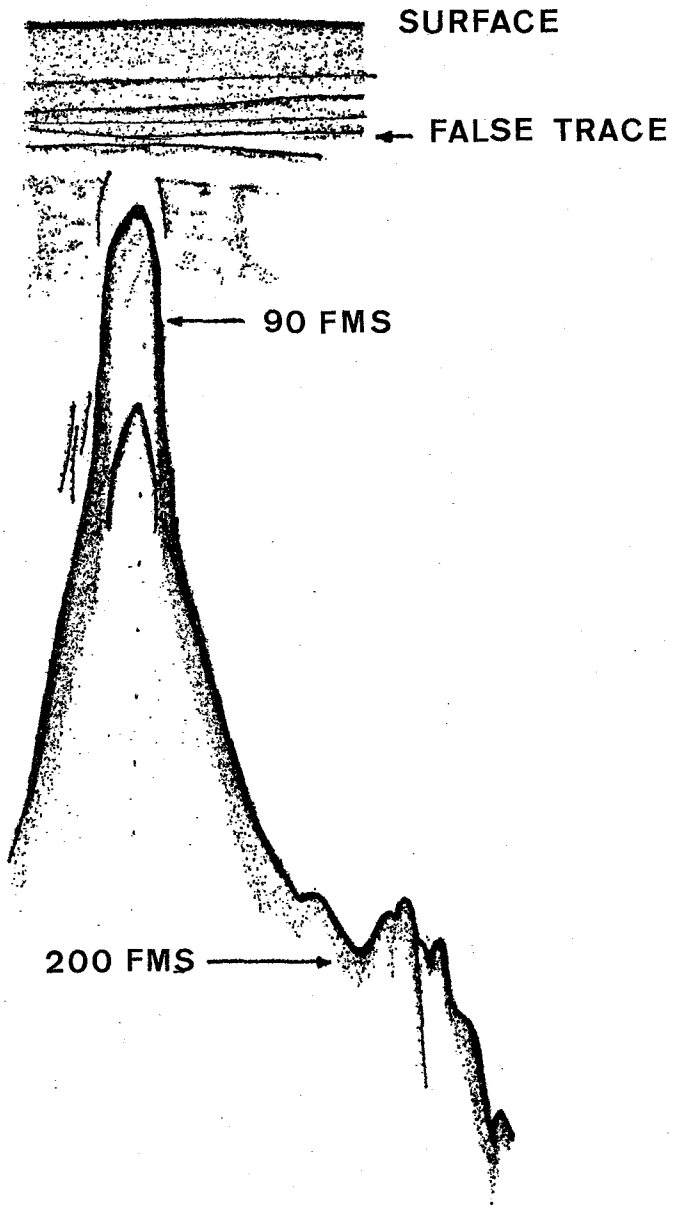

Figure 2. A bottom profile in 90 to 200 fms, NNW of St. Thomas, VI; 18°35' N latitude, 65°07' W longitude. Nine Queen snapper weighing 76 lbs and one Misty grouper weighing 35 lbs were caught during two hours of fishing with bottom lonelings at this site.

Table 1.--Fish species, number and weight captured with bottom longline gear, 50 to 300 fms north of Puerto Rico, Culebra Island and St. Thomas, VI

SCIENTIFIC NAME	COMMON NAME	NO.	LBS.
Family: Lutjanidae	Snappers		
Lutjanus vivanus	Silk snapper	46	206.0
Etelis oculatus	Queen snapper	17	162.0
Pristipomoides macropthalmus	Wenchman	73	132.1
Lutjanus analis	Mutton snapper	8	67.0
Lutjanus jocu	Dog snapper	4	48.0
Lutjanus buccanella	Blackfin snapper	12	30.5
Lutjanus synagris	Lane snapper	2	2.5
Rhomboplites aurorubens	Vermilion snapper	1	1.0
Total		163	649.1
Family: Serranidae	Groupers		
Epinephelus mystacinus	Misty grouper	42	1123.0
Epinephelus flavolimbatus	Yellowedge grouper	7	185.0
Mycteroperca venenosa	Yellowfin grouper	2	37.8
Epinephelus guttatus	Red hind	24	30.6
Epinephelus striatus	Nassau grouper	1	16.0
Epinephelus morio	Red grouper	1	10.0
Cephalopholis fulva	Coney	2	1.5
Total		82	1403.9
Other Species			
Mustelis canis	Smooth dogfish	67	453.0
Hexanchus griseus	Sixgill shark	17	415.0
Squalus spp. 1/	Dogfish shark	61	270.5
Centroscyllium fabricii	Black dogfish	13	106.0
Seriola dumerili	Greater amberjack	2	43.0
Carcharhinus falciformis	Silky chark	1	15.5
Sphyraena barracuda	Great barracuda	1	14.5
Ophichthus ocellatus	Pale spotted eel	4	12.5
Caranx lugubris	Black jack	1	11.0
Brotula barbata	Bearded brotula	2	8.3
Heptranchias perlo	Sevengill shark	2	8.0
Haemulon album	Margate	1	7.0
Gymnothorax moringa	Spotted moray	5	5.5
Holocentrus ascensionis	Squirrelfish	1	0.4
Total		178	1370.2
Grand Total		423	3423.2

1/ Largely Cuban dogfish, Squalus cubensis

Table 2.--Summary of snapper and grouper catch data caught with bottom long-line gear in 50 to 300 fms. north of Puerto Rico, Culebra Island and St. Thomas, V. I.

POSITION		SNAPPER WEIGHT	GROUPER WEIGHT	COMBINED WEIGHT	PERIOD	DEPTH
N. Lat.	W. Long.	Lbs.	Lbs.	Lbs.	N/D*	Fms.
18°35'	67°08'	12	--	12	N	158-160
18°31'	66°28'	20	58	78	D	140-200
18°31'	66°28'	12	32	44	D	250-300
18°28'	66°10'	2	--	2	N	130-175
18°28'	66°06'	--	--	--	N	55-90
18°30'	66°12'	--	--	--	N	50-150
18°31'	66°15'	40	85	125	D	200
18°29'	66°05'	24	--	24	D	50-100
18°29'	66°04'	2	--	2	N	175-260
18°30'	65°57'	2	55	57	N	170-220
18°30'	66°03'	--	--	--	D	220-265
18°29'	66°04'	--	15	15	D	148-250
18°28'	66°04'	--	--	--	D	50-100
18°29'	65°55'	2	83	85	N	154-205
18°29'	65°53'	15	--	15	N	50-100
18°31'	66°00'	18	64	82	D	168-215
18°30'	65°59'	15	66	81	D	150-190
18°29'	65°58'	3	--	3	D	78-95
18°29'	65°51'	21	--	21	N	50-150
18°30'	65°49'	--	137	137	N	100-175
18°30'	65°56'	11	45	56	D	175-270
18°29'	65°52'	--	22	22	D	176-250
18°28'	65°49	--	1	1	N	190-200
18°29'	65°41'	--	67	67	N	176-250
18°30'	65°37'	33	--	33	N	50-105
18°29'	65°49'	--	--	--	D	101-175
18°29'	65°46'	--	--	--	D	70-124
18°30'	65°32'	--	7	7	N	48-102
18°32'	65°32'	--	--	--	N	176-320
18°28'	65°45'	15	26	41	D	90-210
18°30'	65°30'	31	131	162	N	176-250

Table 2.--Continued

POSITION N. Lat.	POSITION W. Long.	SNAPPER WEIGHT Lbs.	GROUPER WEIGHT Lbs.	COMBINED WEIGHT Lbs.	PERIOD N/D*	DEPTH Fms.
18°29'	65°29'	8	36	44	N	45-76
18°27'	65°39'	5	1	6	D	50-100
18°29'	65°35'	17	--	17	D	50-208
18°30'	65°29'	8	45	53	N	101-175
18°32'	65°18'	4	115	119	N	110-215
18°29'	65°36'	6	--	6	D	82-140
18°32'	65°17'	--	65	65	N	50-150
18°32'	65°12'	10	16	26	N	40-140
18°29'	65°33'	45	70	115	D	150-220
18°29'	65°31'	--	24	24	D	50-145
18°35'	65°08'	17	15	32	N	100-165
18°35'	65°05'	27	13	40	N	42-186
18°30'	65°32'	--	3	3	D	85-175
18°29'	65°29'	4	46	50	D	110-195
18°34'	65°05'	23	19	42	N	100-220
18°35'	65°04'	--	--	--	N	170-280
18°37'	64°59'	47	--	47	D	107-166
18°37'	64°59'	--	--	--	D	102-170
18°35'	65°07'	76	35	111	D	90-200
18°35'	65°04'	41	--	41	N	50-100
18°36'	65°04'	10	30	40	N	110-176
TOTAL		626	1427	2053		

*N = Night

D = Day

Table 3.--Fish species, number and weight captured with electric commercial snapper reels, 17 - 200 fms

SCIENTIFIC NAME	COMMON NAME	NO.	LBS.
Family: Lutjanidae	Snappers		
Lutjanus vivanus	Silk snapper	11	15.2
Etelis oculatus	Queen snapper	1	5.5
Lutjanus buccanella	Blackfin snapper	1	3.5
Family: Serranidae	Groupers		
Epinephelus guttatus	Red hind	3	3.5
Epinephelus mystacinus	Misty grouper	1	2.5
Epinephelus morio	Red grouper	1	1.0
Other Families			
Remora remora	Remora	1	5.5
Mustelus canis	Smooth dogfish	1	4.0
Total		20	40.7

Table 4.--Fish species, number and weight captured with wire fish traps, 27-49 fms.

SCIENTIFIC NAME	COMMON NAME	NO.	LBS.
Family: Lutjanidae	Snapper		
Lutjanus buccanella	Blackfin snapper	17	25.8
Lutjanus analis	Mutton snapper	1	15.3
Rhomboplites aurorubens	Vermilion snapper	26	10.5
Lutjanus vivanus	Silk snapper	9	5.8
Lutjanus synagris	Lane snapper	6	2.3
Total		59	59.7
Family: Serranidae	Groupers		
Epinephelus striatus	Nassau grouper	4	45.0
Epinephelus morio	Red grouper	2	25.0
Mycteroperca venenosa	Yellowfin grouper	1	13.5
Epinephelus guttatus	Red hind	4	7.6
Cephalopholis fulva	Coney	2	1.0
Total		13	92.1
Other Families			
Haemulon aurolineatum	Tomtate	7	2.5
Gymnothorax moringa	Spotted moray	1	2.0
Lactophrys trigueter	Smooth trunkfish	3	1.8
Haemulon plumieri	White grunt	1	1.3
Holocentrus ascensionis	Squirrel fish	4	1.0
Holocentrus rufus	Longspine squirrelfish	2	0.3
Pseudupeneus maculatus	Spotted goatfish	1	0.3
Total		19	9.2
Grand Total		91	161.0